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A New Species of Gastropod of the Genus *Trophon* Montfort, 1810 (Mollusca: Gastropoda: Muricidae) from Subantarctic Waters

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Abstract. *Trophon* ***veronicae,*** a new species of gastropod belonging to the subfamily Trophoninae, is described from deep waters off southern Chile, Argentina, and subantarctic seas. This new species is similar to *T. mucrone* Houart from South Brazilian waters. *Trophon* ***veronicae*** sp. nov. can be distinguished from *T. mucrone,* which is known only from the shell, by its larger size and more slender profile. In addition, the siphonal canal of *T.* ***veronicae*** is very long and curved. The radula and penis of *T.* ***veronicae*** are described and illustrated with SEM photographs.

INTRODUCTION

The genus *Trophon* Montfort, 1810, comprises a group of predatory marine neogastropods that are endemic to South American and Antarctic waters. The genus includes approximately 35 Recent species inhabiting Antarctic waters and ranging as far north as Rio de Janeiro, Brazil. Most of these species live in water less than 500 m deep; several range to 1000 m, and very few live deeper. *Trophon* ***veronicae*** sp. nov. is described from bathyal depths of the subantarctic waters off Chile and Argentina.

MATERIALS AND METHODS

The holotype and paratypes are from material collected by the United States Antarctic Program on several different cruises, plus one additional specimen housed in the collection of the United States National Museum of Natural History (USNM). One paratype has been deposited in the malacological collection of the Departamento de Zoología Invertebrados, Museo de La Plata, Argentina (MLP-5363).

The radulae were prepared according to the method described by Solem (1972) and observed under the scanning electron microscope (SEM). The type series contains two specimens with soft parts. These were dissected; the penis was critical point dried, coated with Au-Pd, and photographed under the SEM.

Shell ultrastructure data were procured from freshly fractured shell fragments of two specimens. The fragments were cut out from the central lip of the last whorl, and also were examined by SEM.

SYSTEMATICS

Class Gastropoda Cuvier, 1797

Order Neogastropoda Wenz, 1938

Family MURICIDAE Rafinesque, 1815

Subfamily TROPHONINAE Cossmann, 1903

Genus *Trophon* Montfort, 1810

Type species: *Murex magellanicus* Gmelin, 1791 (= *Trophon geversianus* (Pallas, 1774)) by original designation.

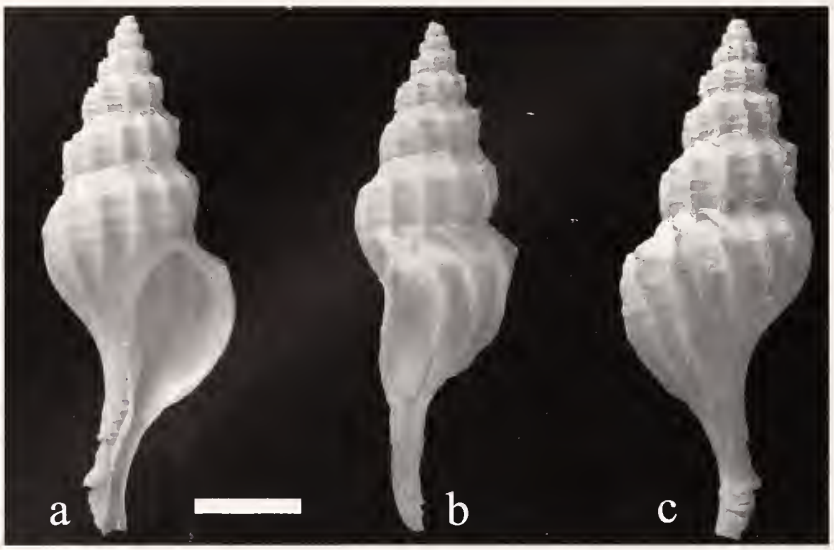
Trophon ***veronicae*** Pastorino, sp. nov.

(Figures 1–12)

Type locality: Eltanin Cruise 25 stat. 325, Blake trawl, off southern Chile 46°00′S, 83°59′W, 742 m, collected on 9 October 1966.

Type material: Holotype and 11 paratypes in USNM, 1 paratype in MLP.

Material examined: Holotype, USNM 880195, Eltanin Cruise 25 sta. 325, 46°00′S, 83°59′W, Blake trawl, 742 m; 5 paratypes, USNM 880196, Eltanin Cruise 25, sta. 326, 46°04′S, 83°55′W, Blake trawl, collected on 9 October 1966, 298 m; 5 paratypes, USNM 870370, Eltanin Cruise 9, sta. 661, 50°32′S, 43°32′W, Menzies trawl, collected on 11 August 1963, 1272–1281 m; 1 paratype, USNM 97071, 53°01′S, 73°42′W, 675 m; 1 paratype, MLP 5363, Eltanin Cruise 25 sta. 325, 46°00′S, 83°59′W, Blake trawl, collected on 9 October 1966, 742 m; 2 broken specimens, USNM 880197, Eltanin Cruise 25, sta. 326, 50°32′S, 43°32′W, Blake trawl, collected on 9 October 1966, 298 m.



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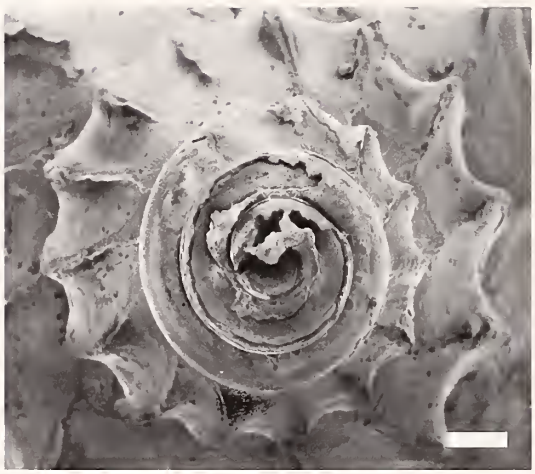

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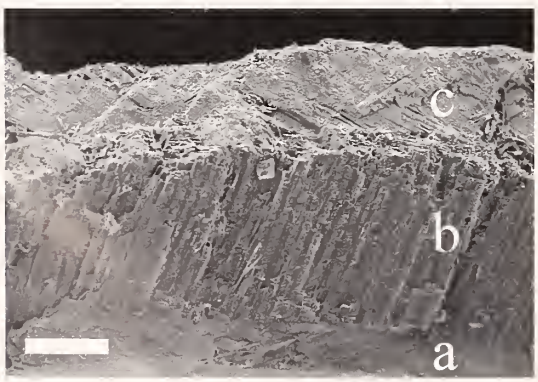

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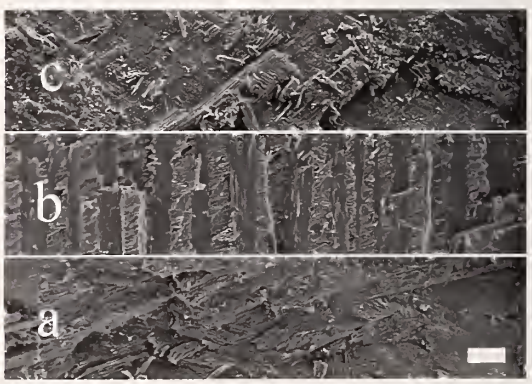

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Distribution: Known from off southern Chile, the Strait of Magellan, and off South Georgia Islands in 298–1272 m (Figure 13).

Etymology: This species is dedicated to Verónica A. Ivanov.

Description: Shell large (to 52 mm), elongate, biconic, fusiform, very slender, chalky; protoconch worn on all but one specimen, of at least two and a half whorls; teleoconch of seven sharply shouldered whorls, spire very high, about one-third of total shell length. Spire angle about 45°; suture abutting; subsutural ramp steeply inclined; aperture subovoidal, interior glossy white; anterior siphonal canal very long (same length as aperture), narrow, curved, open; posterior canal weakly demarcated in some specimens; umbilicus absent; outer lip rounded with reflected edges; inner lip gently curved, adpressed. Axial sculpture of 12–13 regular, weakly lamellose varices on last whorl. Regular growth lines present throughout shell. Spiral ornamentation consisting of three cords, always below shoulder, that become obsolete over last whorl; entire shell surface covered by regular, delicate spiral threads.

Shell ultrastructure composed of three layers (Figures 5, 6); innermost layer (0.1 shell thickness), composed of collabrally aligned crossed lamellar aragonite, middle layer thick (0.45 shell thickness) of crossed lamellar aragonite with crystal planes oriented perpendicular to growing edge; outer layer thick (0.45 shell thickness) with collabral lamellae of crossed lamellar aragonite.

Operculum (Figure 11) oval, subpolygonal, with terminal nucleus abraded in adult specimens. External surface covered by concentric, irregular, often overlapping growth lines. Inner surface with 15–20 regularly rounded and continuous growth lines; very heavily callused, glazed rim present in adult specimens.

Animal small relative to shell. Mantle large, mantle roof thin. Cephalic tentacles medium in size, blunt, with rounded large black eyes; mantle edge thickened, smooth, siphon long; pallial organs arranged as in other rachiglossans; dark osphradium more than half of ctenidium length, thin, slightly asymmetrical, with 75–80 leaflets per side; ctenidium is twice as wide as osphradium, containing 140–150 triangular leaflets. Hypobranchial gland brownish and inconspicuous, rectum and large penis to right of hypobranchial gland.

Penis large, more than four times length size of tentacles, wide, flat; papilla conical, flanked by two flaplike extensions of the penis edge.

Pleurembolic proboscis short, broad. Radular ribbon small, extending beyond rear of buccal mass. Esophagus loops toward left side, where it receives embedded ducts of salivary glands just anterior to valve of Leiblein. Esophagus joined by brown, well-developed, gland Framboisse just posterior to the nerve ring. Large salivary glands envelop retracted proboscis. Accessory salivary glands small, embedded in salivary glands. Gland of Leiblein conspicuous, overlays esophagus, ends posteriorly in a short blind duct with a small ampulla.

Rachiglossan radula (Figures 7, 8, 10) with rachidian teeth very wide (200 μm), central cusp thin, large; lateral cusps half size of central cusp, pointing outward, with inner edge slightly curved; denticle between central and lateral cusp very small, thin, almost obsolete. Base of rachidian tooth strongly curved. Marginal area large, smooth. Lateral teeth with single, long cusps along outer edge of narrow basal plate.

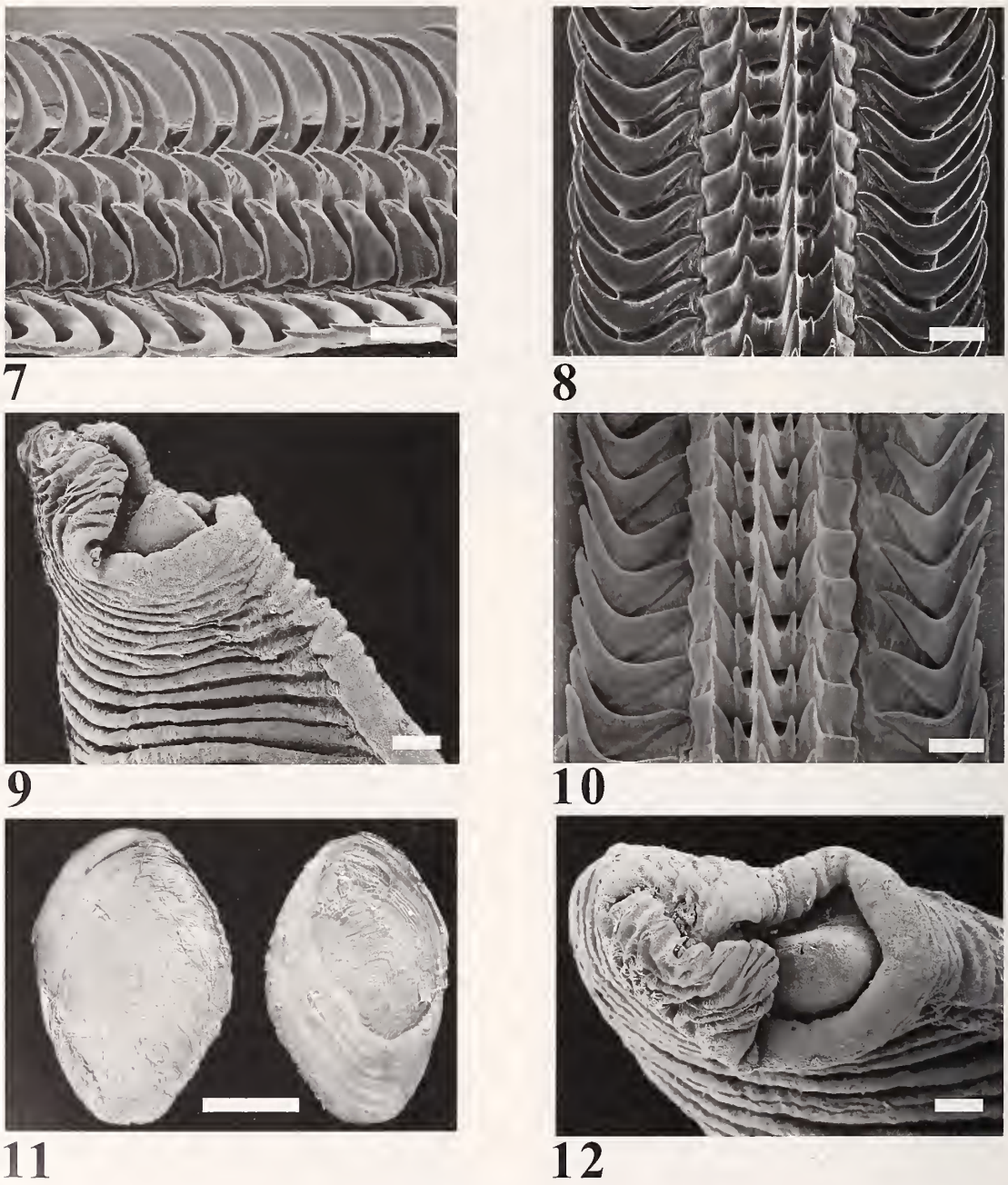
Juvenile specimens have proportionally larger inner denticles and thinner rachidian teeth (Figure 10). In addition, the base of the rachidian teeth of juveniles is more curved. Lateral teeth are shorter, thicker. In lateral view both stages have rachidian teeth with a triangular profile.

Remarks: The whole complex of the southern South American and Antarctic Trophoninae includes at least 50 described species in addition to several still undescribed. Two groups are clearly differentiated by radular characters. The Patagonian group has complex radulae with the rachidian teeth bearing three cusps, a typical denticle on the inner edge of the lateral cusps, and several denticles along the outer side. Two very developed marginal cusps are also present. In contrast, the Antarctic group has several types of radulae, but always within the same pattern of a tricuspid, rachidian with an inner, intermediate denticle rising from the base of this tooth, and without marginal cusps. Regarding shell characters, the protoconch on most of the Patagonian representatives is in general asymmetrical and paucispiral. The Antarctic species present a variety of morphologies, including that of *T. **veronicae.*** Compared with the South American group, this new species most closely resembles *T. mucrone* Houart, 1991, from the Abrolhos Archipelago of southeastern Brazil, but is almost twice the length and width of *T.*

←

Figures 1–6

*Trophon **veronicae*** Pastorino, sp. nov. 1, a–c holotype USNM 880195 2. Paratype MLP 5363, scale bar = 1 cm; 3. Paratype USNM 880196, protoconch apical view, SEM not coated, scale bar = 200 μ. 4. Same specimen side view, SEM not coated, scale bar = 200 μ. 5. Shell ultrastructure, a. innermost aragonitic layer, b. medium aragonitic layer, c. external aragonitic layer, SEM coated, scale bar = 100 μ. 6. Detail of the layers in Figure 5, scale bar = 2 μ.



Figures 7–12

Trophon ***veronicae*** Pastorino, sp. nov. 7–8. Radula, side view; scale bar = 80 μ; SEM USNM 880195; 9. Penis, scale bar = 300 μ. 10. Radula, juvenile specimen, scale bar = 20 μ. 11. Operculum dorsal and ventral view, scale bar = 4 cm. 12. Penis side view, scale bar = 200 μ.

mucrone (Table 1). *Trophon* ***veronicae*** is also narrower and much more slender than *T. mucrone,* although the number of lamellae are similar. The siphonal canal is long and curved in *T.* ***veronicae*** but straight and shorter in *T. mucrone.*

Based on the limited material available, the number of protoconch whorls in *T.* ***veronicae*** is almost twice that of *T. mucrone.*

In addition, the transition between protoconch and teleoconch is indistinct in the new species, whereas it is abrupt in *T. mucrone.*

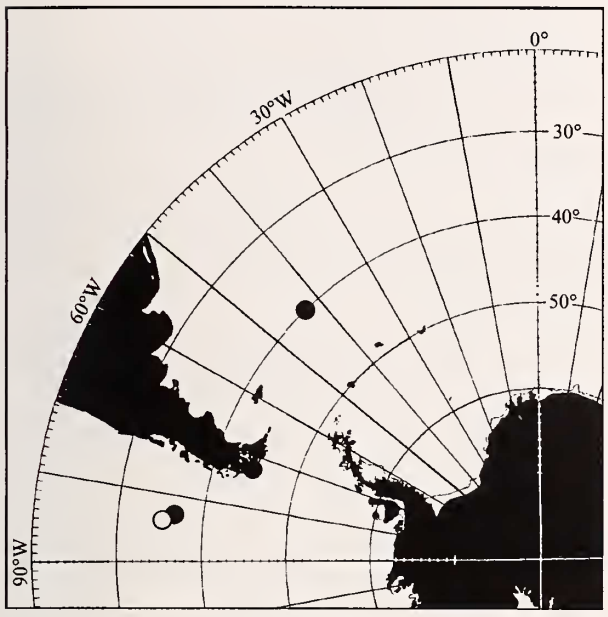


Figure 13

Localities at which *Trophon* ***veronicae*** Pastorino, sp.nov. (circles, white type locality) was collected in subantarctic waters off Chile and Argentina.

The radulae and soft parts could not be compared because they remain unknown for *T. mucrone.*

Trophon coulmanensis Smith, 1907 known from Antarctic Peninsula and Kerguelen Islands (Dell, 1990) is the only other morphologically similar species in the Antarctic. However, differences in size are significant; all the specimens known of *T. coulmanensis* are not larger than 25 mm. In addition, the protoconch of *T. coulmanensis* is asymmetrical and paucispiral, while axial lamellae of the teleoconch usually develop a peripheral spine that never appears in *T.* ***veronicae.***

Harasewych (1984) illustrated the penes of two species belonging to the subfamily Trophoninae: the type species of *Trophon, T. geversianus* (Pallas, 1774) and *Boreotrophon aculeatus* (Watson, 1882). Both species have a dorsoventrally compressed, large penis with a terminal papilla. According to Kool (1993b), *T. geversianus* also has a vas deferens as an open duct into the mantle cavity, which is very different from the closed duct of *T.* ***veronicae.*** In a very comprehensive paper about the phylogeny of the Rapaninae, Kool (1993a) described the male reproductive structures of 18 type species of accepted genera. Wu (1985) described and illustrated the penis morphology of seven species of the genus *Acanthina* Fischer, 1807. None of the species studied thus far has a penis with lateral folds enveloping the papilla, as here described.

The novel structure of the penis and radula could be indicative of a different generic position. However, the incomplete knowledge of the soft parts of other species of Trophoninae precludes extensive comparisons.

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Table 1

Measurements of *T.* ***veronicae*** sp. nov. and *T. mucrone* Houart (in mm).

	Length	Width	Whorls	Lamellae on last whorl
T. ***veronicae*** sp. nov.				
USNM 880195 holotype	52.2	19.6	7	13
MLP 5363 paratype	48.6	19.1	7	13
USNM 880196 paratype	28.8	11.76	7	13
USNM 880196 paratype	34.0	15.0	7	18
USNM 880196 paratype	34.6	15.0	7	13
Protoconch USNM 880196	1.07	0.94	2.0–2.5	—
T. mucrone Houart				
MNHN holotype	26.5	11	7	12
Protoconch	0.86	0.71	1.5–1.75	—

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